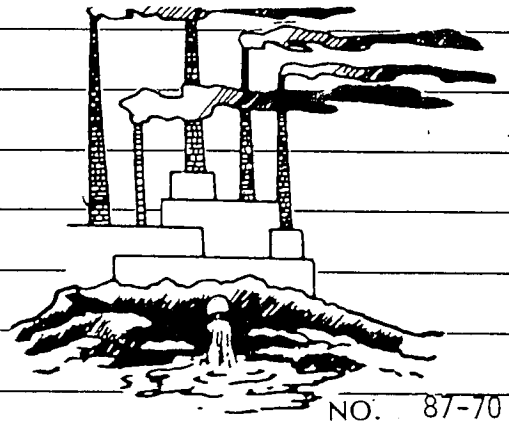
Research

Information bulletin

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

NO. 87-70
DATE July 1987



Elevated Mercury and Selenium are Found in White-faced Ibis at Carson Lake, Nevada

Selenium and mercury residues found in white-faced ibis eggs in Nevada are near the low end of the range found at Kesterson. Reproductive implications are being investigated.

White-faced ibis return in early April to Carson Lake, one of the most heavily used waterbird nesting areas in Nevada. The large nesting colony consists of several population segments which nest synchronously but on different schedules from other segments. The earliest nesting segment spends a very short time in the area before laying eggs.

In 1985, one egg each was collected from 20 nests in the earliest nesting population segment, and another 20 eggs from the last nesting segment to study potential DDT contamination. Eggs were analyzed for organochlorines, mercury and selenium. Substantial mercury accumulation had been reported previously in fish from nearby Carson River; high levels of selenium had been found in conjunction with return flows of irrigation drainwater. One month after the last eggs were obtained, 18 adult ibis were collected from the colony for contaminant analysis and to determine food habits.

Eggs of Late Nesters Had Higher Contaminant Levels

Mercury and selenium concentrations were higher ($P<0.001$) in eggs of the late nesting segment than those laid by the early nesting segment (Table 1). White-faced ibis stomach contents (mostly earthworms and insect larvae) averaged over 5 ppm mercury and 1.4 ppm selenium (all contaminants reported on dry weight basis). The presence of these contaminants in food consumed by ibis, and the apparent relationship between the time spent on breeding grounds and the increase in egg concentrations, indicate that mercury and selenium were accumulated in the vicinity of Carson Lake.

Table 1. Mean levels of mercury and selenium present in white-faced ibis eggs and tissues collected at Carson Lake, NV, in 1985

Category	n	Mercury (ppm)	Selenium (ppm)
Eggs early (April 23)	20	0.23	3.4
Eggs late (May 24)	20	0.82	5.7
Liver (adults)	18	28	10.5

Are Residues High Enough to Cause Reproductive Problems?

High selenium concentrations have been associated with embryo deformities and reduced hatchability of eggs in several bird species. Ohlendorf et al. (1986, Trans. N.A. Wildl. & Nat. Res. Conf.) reported selenium concentrations (geometric mean) in eggs at Kesterson National Wildlife Refuge that ranged from 69.7 for eared grebes to 6.0 for avocets, with coots, stilts, and ducks having intermediate levels. The selenium values for Carson Lake ibis eggs in 1985 were near the low end of the Kesterson range. Ibis livers from Carson Lake contained less selenium than found in waterbirds at Kesterson. Nevertheless, levels are high enough to merit attention: nesting studies are underway at Carson Lake and Stillwater Wildlife Management Area to evaluate possible reproductive effects of selenium, mercury, and pesticides.

Nevada ibis feed primarily in flood-irrigated alfalfa fields, not in marshes or drainage canals where pollutants may be more concentrated, and, therefore, they may not be the best indicator species of selenium and mercury problems. Several species which spend more time in the marshes, including redhead and gadwall, black-necked stilt, and coot, were added to the study in 1986 to broaden its scope.

For further information, contact:

Dr. Charles J. Henny
Patuxent Wildlife Research Center
Pacific Northwest Field Station
480 SW Airport Road
Corvallis, OR 97333
FTS: 8-420-4840; Comm. 503/757-4840